

We claim:

1 1. A bending press for bending metal plates in the
2 production of pipe, comprising:

3 a press bed formed with a lower die against which a
4 metal plate can be pressed to bend said plate;

5 a bending ram extending over the length of said lower
6 die and formed with an upper die of downwardly convex shape
7 engageable with said plate to press said plate against said lower
8 die under said plate; and

9 an articulation for said upper die.

1 2. The bending press defined in claim 1 wherein said
2 articulation for said upper die includes a pivot having a pivot
3 axis extending parallel to said lower die between said upper die
4 and a foot of said ram.

1 3. The bending press defined in claim 2 wherein said
2 articulation includes a pivot for said ram at an upper end
3 thereof having a pivot axis parallel to said die.

1 4. The bending press defined in claim 3 wherein said
2 articulation forms a pivot axis for said upper die close to an
3 upper surface of said plate.

1 5. The bending press defined in claim 4, further
2 comprising at least one force-restoring member braced to bias
3 said upper die back into an original position upon displacement
4 of said upper die about said articulation.

1 6. The bending press defined in claim 5 wherein said
2 upper die is articulated on said ram, said force-restoring member
3 including a spring braced between said ram and said upper die.

1 7. The bending press defined in claim 5 wherein said
2 ram is formed with said articulation at an upper end thereof and
3 said force-restoring member is braced across said articulation.

1 8. The bending press defined in claim 5 wherein said
2 force-restoring member includes a pair of springs.

1 9. The bending press defined in claim 1 wherein said
2 ram comprises a generally upright plate of substantially uniform
3 wall thickness over its height.

1 10. The bending press defined in claim 3 wherein said
2 articulation includes a pivot for said ram at an upper end
3 thereof having a pivot axis parallel to said die.

1 11. A method of bending a metal plate in the formation
2 of large diameter pipe comprising the steps of repeatedly
3 pressing a metal plate by an upper die at the bottom of a ram
4 driven by a press head from above against a lower die on a press
5 bed and in which the upper and lower die extend over the length
6 of the plate to bend the plate;

7 repeating the bending step until a desired shape is
8 imparted to said plate; and

9 articulating the upper die to enable it to adjust
10 articulating to a contour of said plate during each bending
11 thereof thereby limiting bending stress upon said ram.

1 12. A method of operating a bending press for the
2 bending of steel plate for the production of large diameter pipe,
3 which comprises the steps of:

4 placing a steel plate on a lower die on a bed of a
5 bending press in which said lower die comprises a pair of
6 supports enabling said plate to be bent between them;

7 pressing an upper die against said plate from above at
8 the bottom of a sword-shaped ram driven by a head of the press
9 downwardly to bend said plate; and

10 articulating said upper die during the bending of said
11 plate so as to minimize a bending moment on said ram.